REMARKS

Claims 18, 19, 21, 22 and 24-42 are pending and stand rejected as final. Applicants respectfully request reconsideration of the rejection in view of the following remarks.

The present invention is directed to lightweight, rigid and low thermal-expansion mirrors that could be useful, for example, in semiconductor lithography and space telescopes.

The 35 USC §112, Second Paragraph Rejection

Claims 18, 19, 21, 22 and 24-42 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. In particular, the Action objected to the phrases "substantially amorphous form" in claim 18, and to "substantially amorphous" in claim 26, as being vague and indefinite.

Applicants note that the phrase of claim 26 was present in the claims previously, specifically in dependent claim 4. The only difference is that claim 4 was dependent from claim 1, whereas claim 26 is dependent from claim 24. Claim 4 passed without objection at that time, and only now is (essentially similar) claim 26 rejected as allegedly being indefinite.

In any event, Applicants respectfully submit that the phrase "substantially amorphous" and "substantially amorphous form" are sufficiently clear to meet the requirements of 35 USC. Specifically, the MPEP at Section 2173.05(b) indicates that the word "substantially" is acceptable in patent claims if (a) the phrase containing the word "substantially" is definite in view of the general guidelines contained in the specification, or (b) if one of ordinary skill in the art would know what is meant by the phrase. Applicant respectfully submits that the context of independent claim 18 itself provides the general guidelines by which one of ordinary skill can determine, in the context of the phrase "the reflecting surface comprising silicon metal in substantially amorphous form", that the word "substantially" here means "predominantly" or "the bulk", or "the majority". In the alternative, Applicants would be willing to entertain an Examiner's Amendment proposing the removal of the word "substantially" from independent claim 18. Such an amendment would require no further search or consideration on the part of the examiner, since such a form of the claim was examined previously, and as such raises no new issues. See, for example, Applicant's reply of November 16, 2005.

The 35 USC §103 Rejections

Claims 18, 19, 21, 22, 27, 28, 29, 31-35, 37-39 and 40 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,505,805 to Papenburg et al. (hereinafter referred to as "Papenburg"). Applicants respectfully traverse this rejection.

Applicants respectfully submit that Papenburg neither discloses nor suggests the claimed invention. Specifically, Papenburg neither discloses nor suggests the invention of independent claim 18 and its dependents comprising a silicon metal reflecting surface **in substantially amorphous form**. This invention is significant because it represents a technique whereby silicon can be joined to the substrate at very low joining temperatures (other than by means of an adhesive, which introduces a new batch of problems), thereby greatly reducing stress due to CTE mismatch, which in turn avoids a cracking or fracturing problem of the silicon layer due to the CTE mismatch.

Papenburg discloses that his silicon reflecting surfaces "have an isotropic or polycrystalline structure." (col. 6, lines 31-32) Since Papenburg discloses "silicon wafers" (col. 6, lines 26-31) and since such wafers are often the single-crystal form of silicon, it is possible that Papenburg also teaches single-crystal silicon as his reflecting surface. However, Papenburg neither discloses nor suggests an *amorphous* form of silicon.

The attached Declaration from co-inventor Prashant G. Karandikar showing the results of experimental runs indicates that silicon wafers such as used by Papenburg, will not work in the instant invention whose substrate has even better (i.e., lower) CTE than does the substrate of Papenburg. Thus, the claimed reflecting surface featuring the silicon in substantially amorphous form, which does work, is a significant improvement over the prior art.

Thus, independent claim 18 should be patentable over Papenburg, Applicants respectfully submit.

Moreover, Papenburg neither discloses or suggests the invention of independent claim 24 and its dependents comprising a substrate having a coefficient of thermal expansion (CTE) between about negative 0.46 and about positive 1.75 parts per million per degree Kelvin (ppm/K). Papenburg discloses a substrate CTE (presumably his best) of about 2 ppm/K (col. 12, lines 65-

67). This difference is significant because some applications require very low CTE, with zero CTE being ideal. See, for example, Paragraph [021] of the instant application.

Further on this point, Papenburg neither discloses nor suggests the invention of dependent claim 25, featuring a claimed upper CTE limit of about 1.06 ppm/K.

Although Papenburg seemingly recites the same *general* substrate constituents as are claimed in independent claim 24, the differences in characteristics or properties of the two materials, such as the CTE that is claimed, could easily arise, for example, due to difference in **amounts** of the claimed constituents, among other possibilities. It is certainly true that two materials having the same constituents arranged in the same way will necessarily have the same physical properties. The converse must also be true: two materials that are shown to have different physical properties must necessarily have differences in their constituents or in the way the constituents are arranged.

Thus, the composite composition claimed in independent claim 24 must necessarily be different from what is disclosed by Papenburg. Since this difference is meaningful, the invention of independent claim 24 should also be patentable over Papenburg.

Accordingly, Applicants respectfully request that this rejection be withdrawn.

Claims 30 and 36 were rejected under 35 U.S.C. §103(a) as being unpatentable over Papenburg in view of U.S. Patent No. 5,643,663 to Bommier et al. (hereinafter referred to as "Bommier"). Applicants respectfully traverse this rejection.

Applicants respectfully submit that neither Papenburg nor Bommier, whether taken alone in combination, discloses or suggests the claimed invention. Specifically, Bommier discloses woven carbon fiber material in carbon fiber-reinforced composites. To the extent the reference is combinable with Papenburg against the invention of claims 30 and 36, however, Bommier fails to remedy the absence of teaching in the independent claims (from which these two dependent claims depend) of a reflective coating comprising *silicon metal in substantially amorphous form*, or a *substrate CTE between negative 0.46 and positive 1.75 ppm/K.*

Accordingly, this rejection should be withdrawn.

The Karandikar Declaration also asserts that amorphous silicon has better polishability than the polycrystalline form.

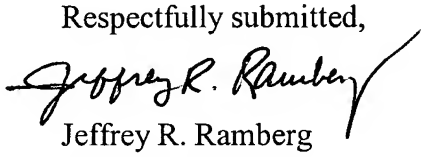
CONCLUSION

The invention as claimed is capable of producing mirrors having ultra low CTE, and of providing a highly polishable low CTE reflective surface for such ultra low CTE substrate in a form (namely substantially amorphous form), that does not crack due to CTE mismatch.

In view of the remarks herein, Applicants respectfully submit that the instant application is in condition for allowance. Accordingly, Applicants respectfully request issuance of a Notice of Allowance directed to claims 18, 19 and 21, 22 and 24-42.

Should the Examiner deem that any further action on the part of Applicants would be desirable, the Examiner is invited to telephone Applicants' undersigned representative.

Respectfully submitted,



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